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# Disease Precognition

Sara Del Valle, PhD

# Global Infectious Disease Burden

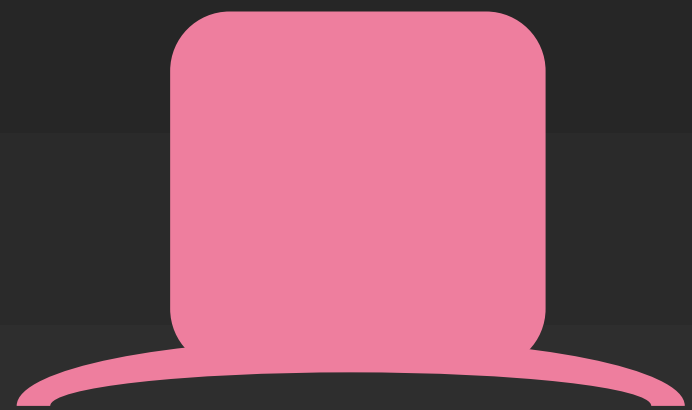


**10,643 outbreaks**

Reported in 2014

**\$21.7 trillion+**

Investments to  
combat COVID-19

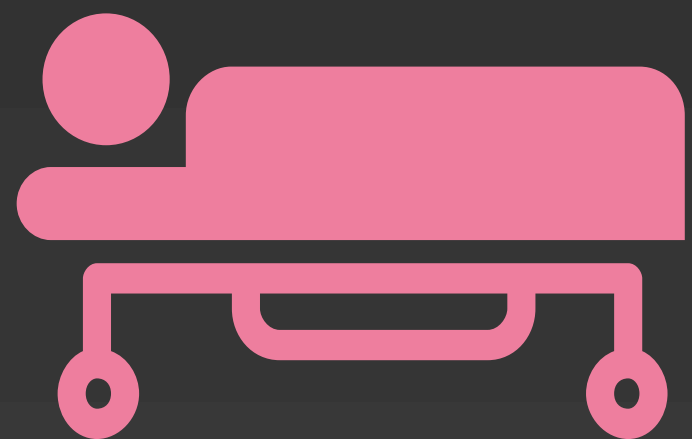


**14.6 million**

Deaths/Year

**\$7 billion+**

Impacts on travel  
due to SARS

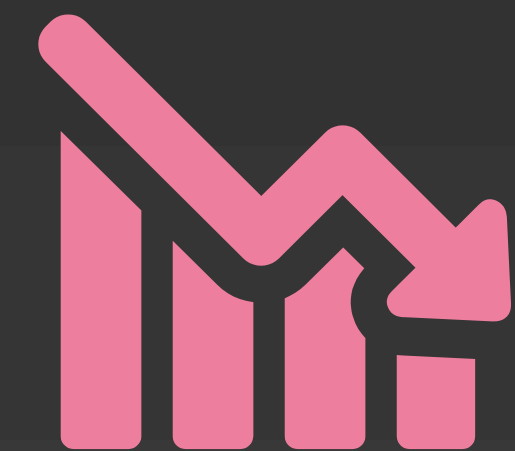


**15.5 million**

Physician  
visits

**3.5%**

Global economy  
shrinkage



How can we **reduce the health & economic impacts** of future epidemics and pandemics?

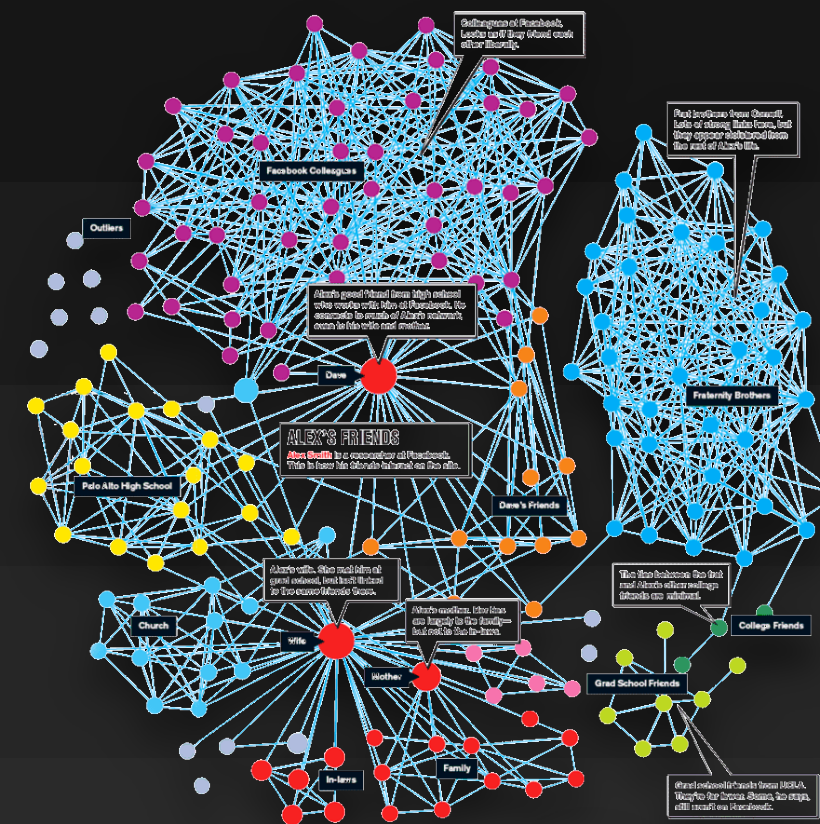
# Global Real-Time Disease Forecasting

## Not just for weather anymore!



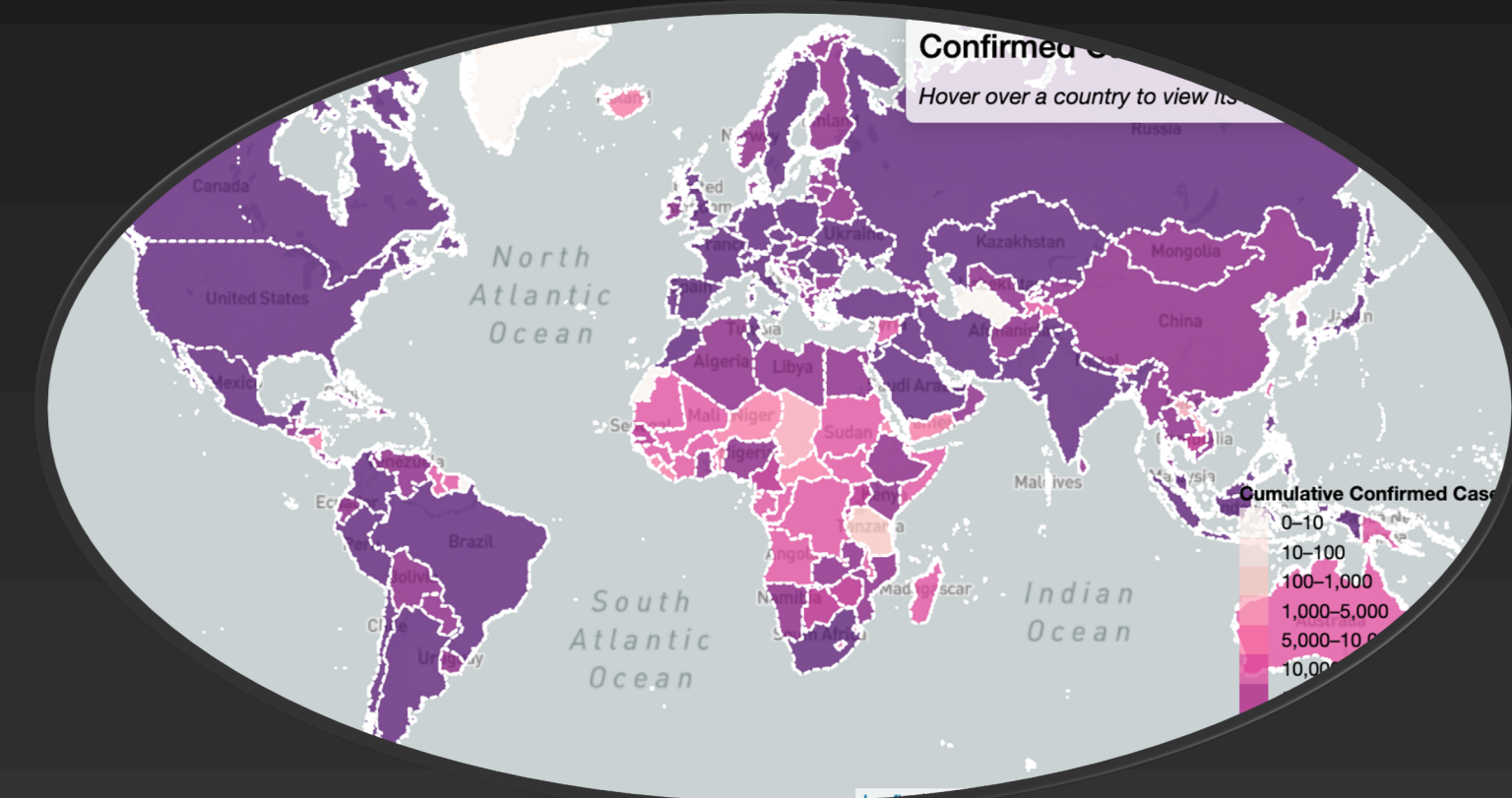
Data

+



Models

=



<https://covid-19.bsvgateway.org>

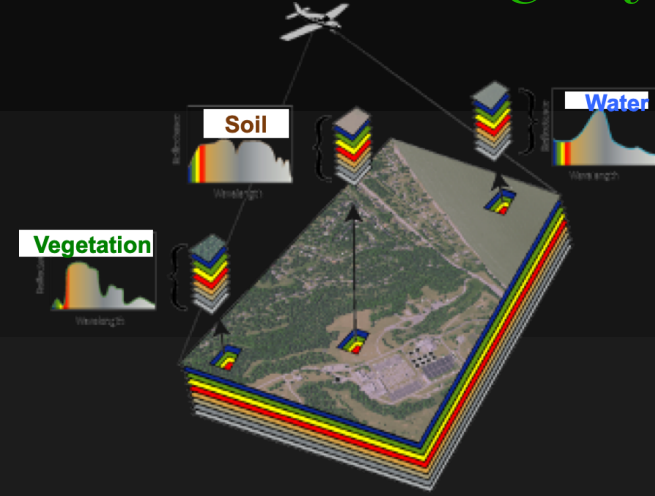
Global Disease  
Forecasts



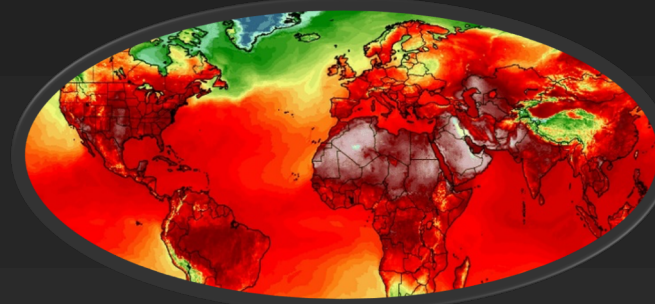


# Disease Precognition Technology

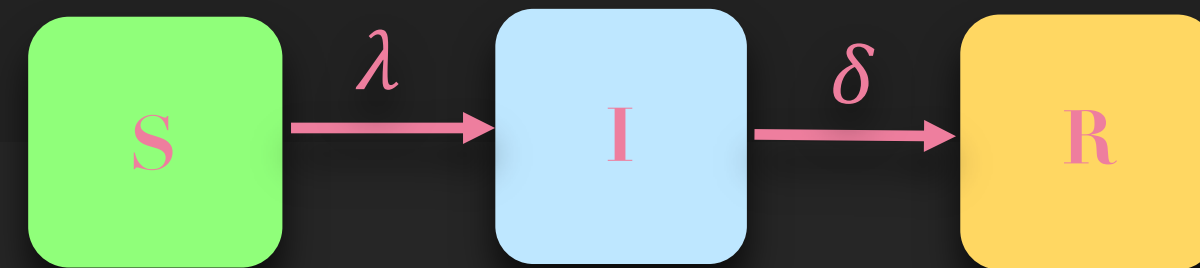
Satellite Imagery



Climatic Drivers



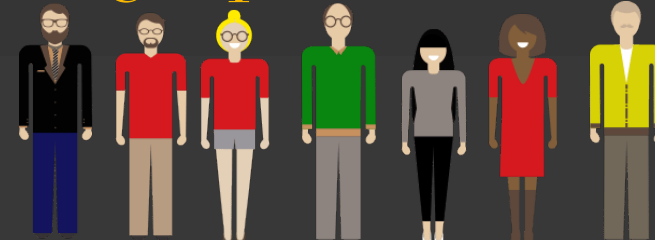
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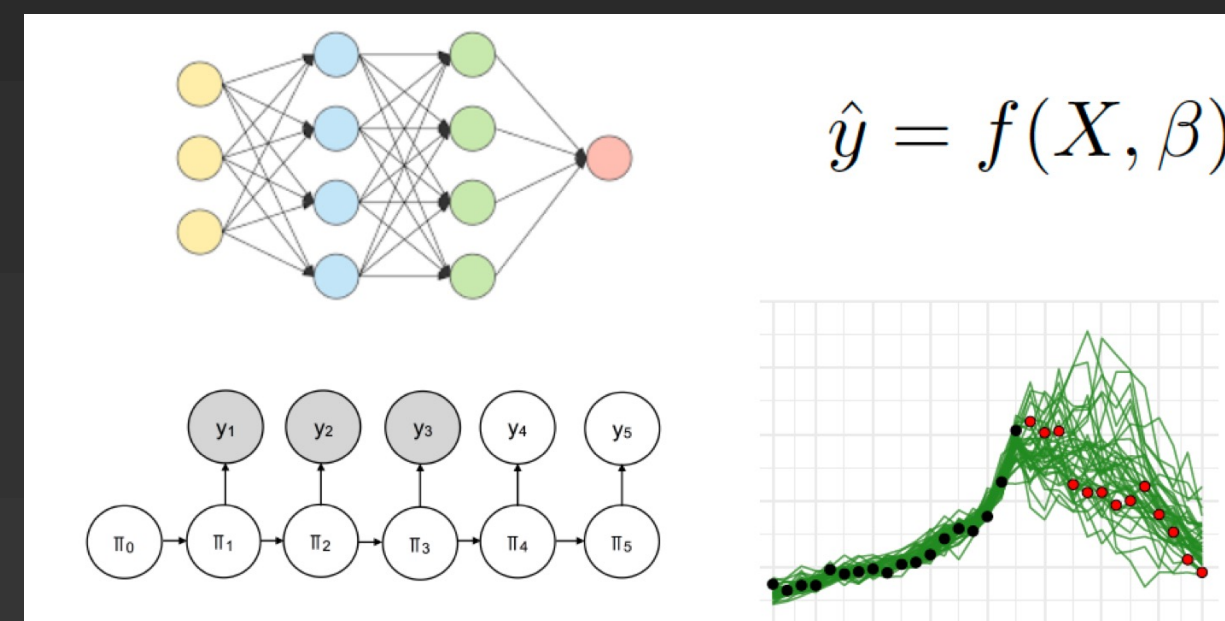
Social Media



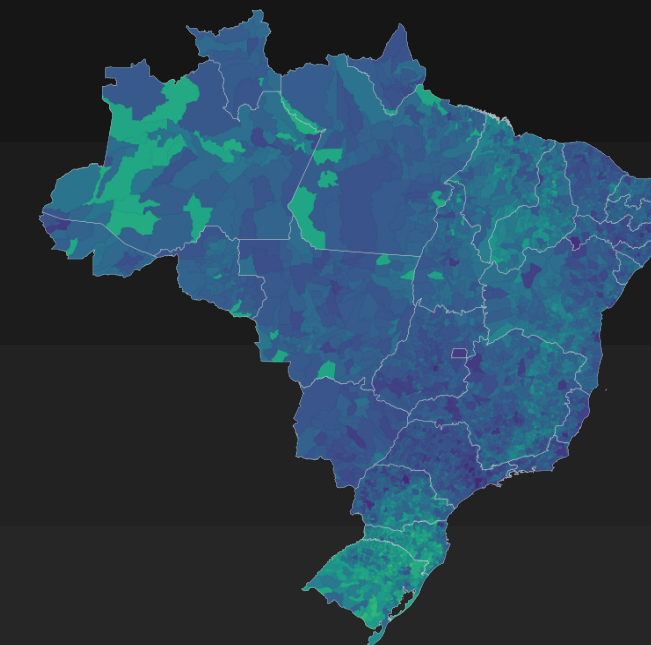
Demographics & Cases



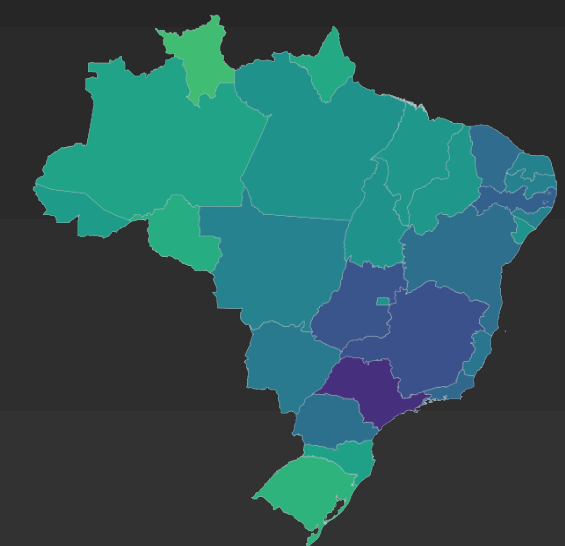
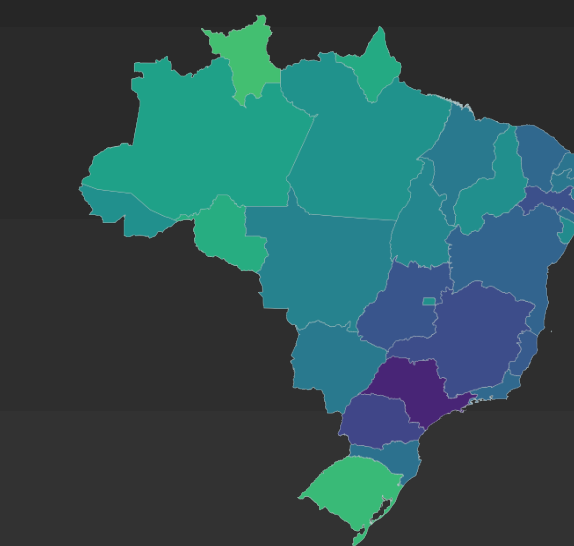
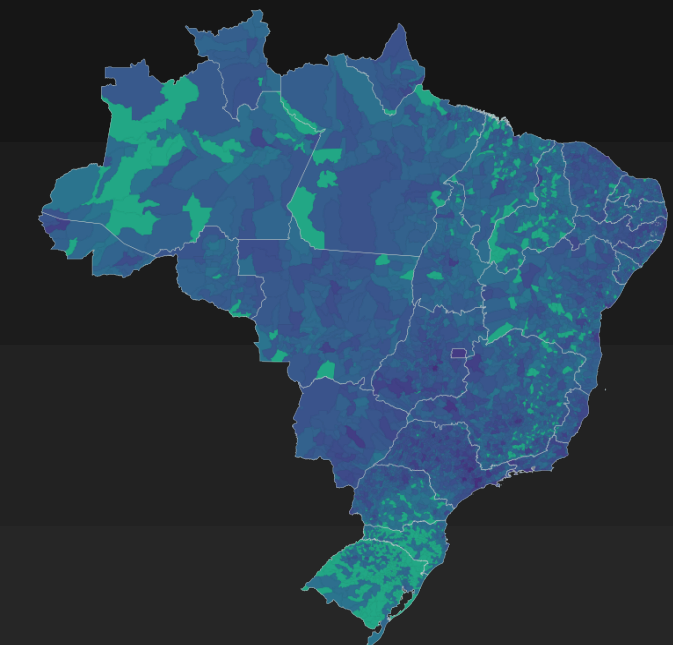
Mechanistic & AI Approaches



Predicted



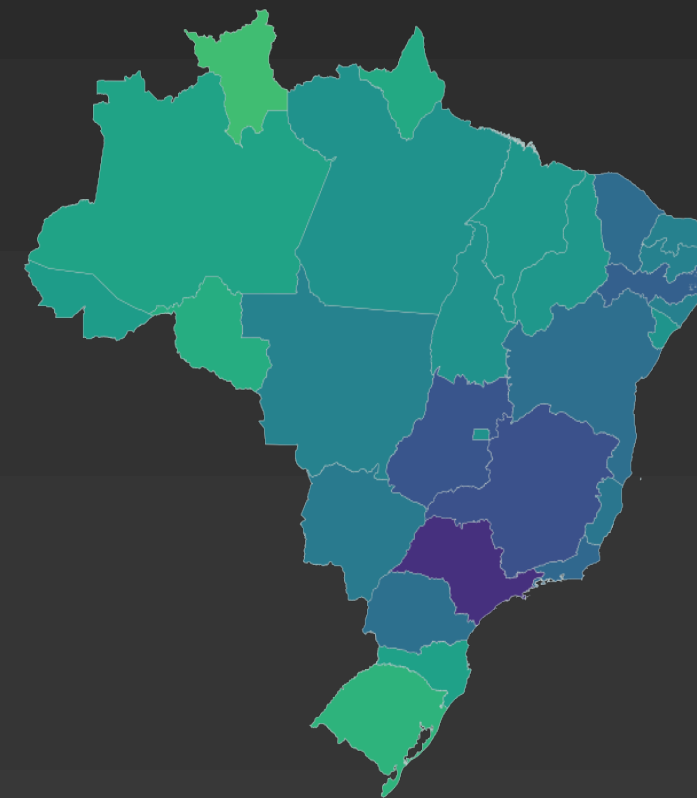
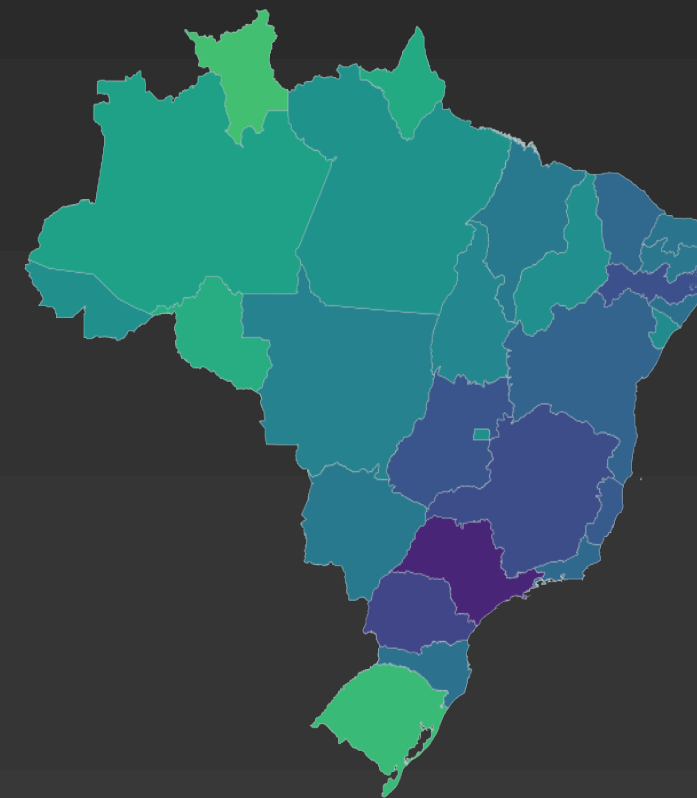
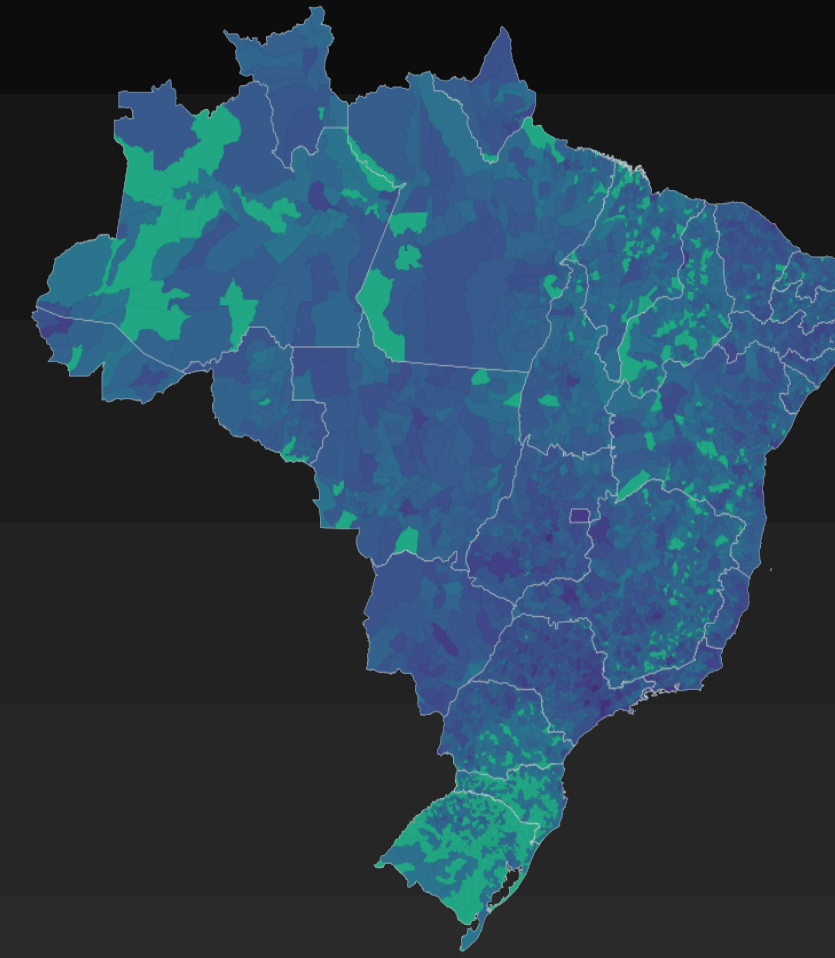
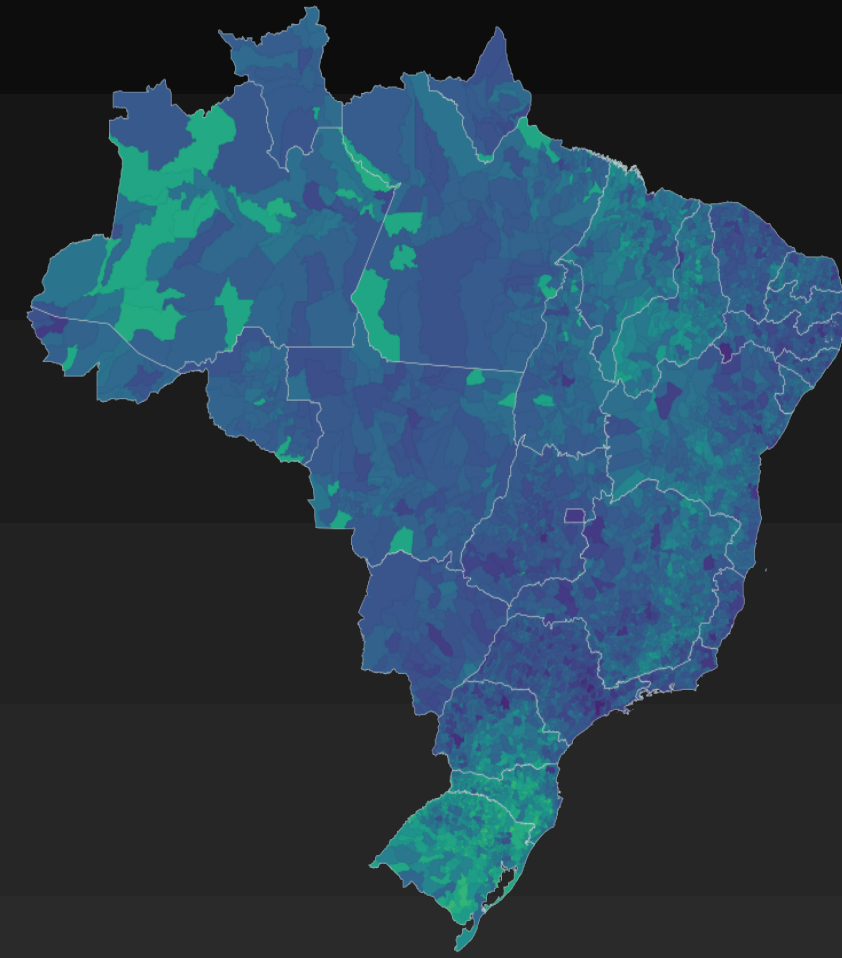
Observed



# Disease Precognition Technology

Predicted

Observed



Low



Dengue Burden

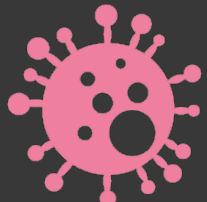
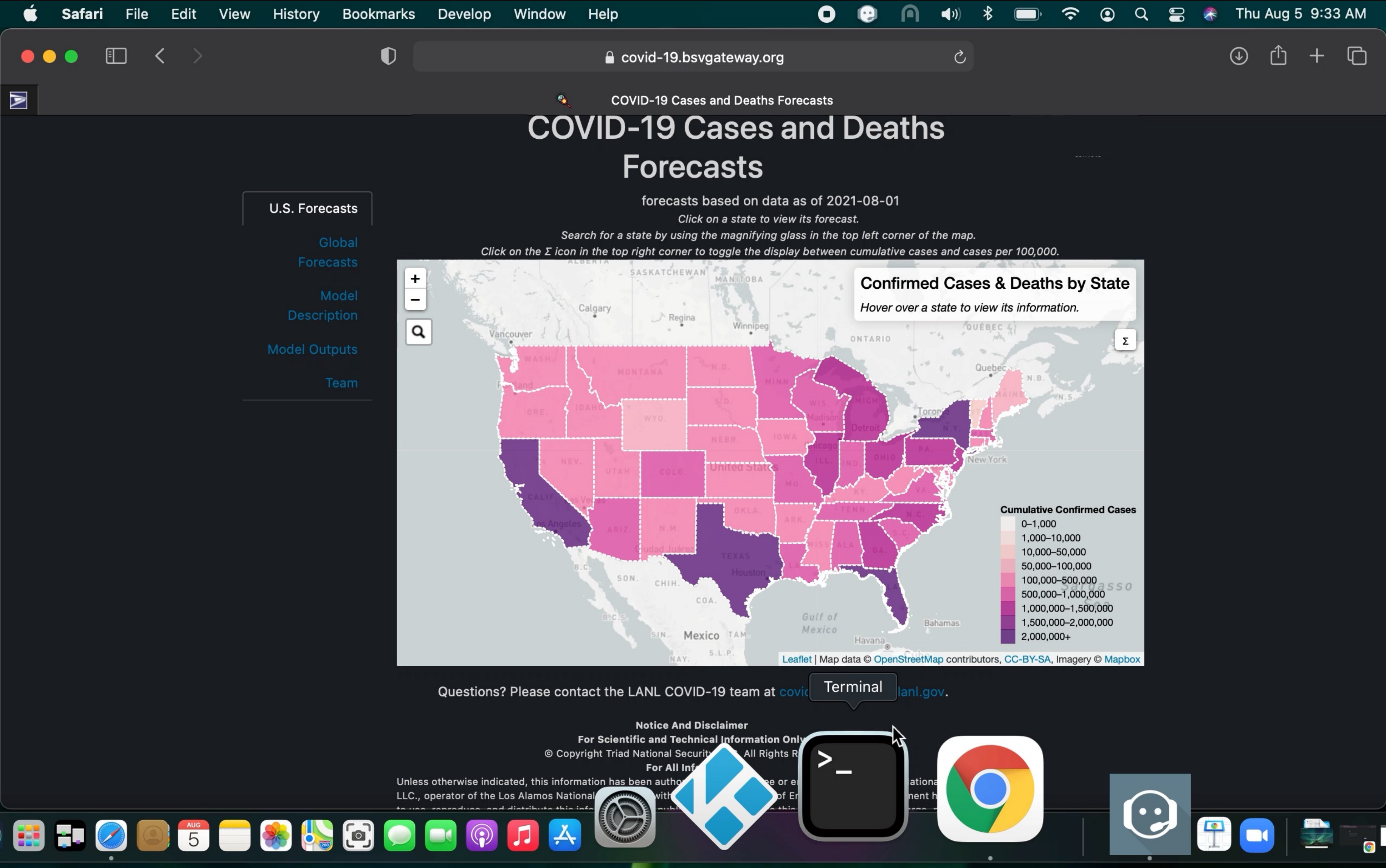


High





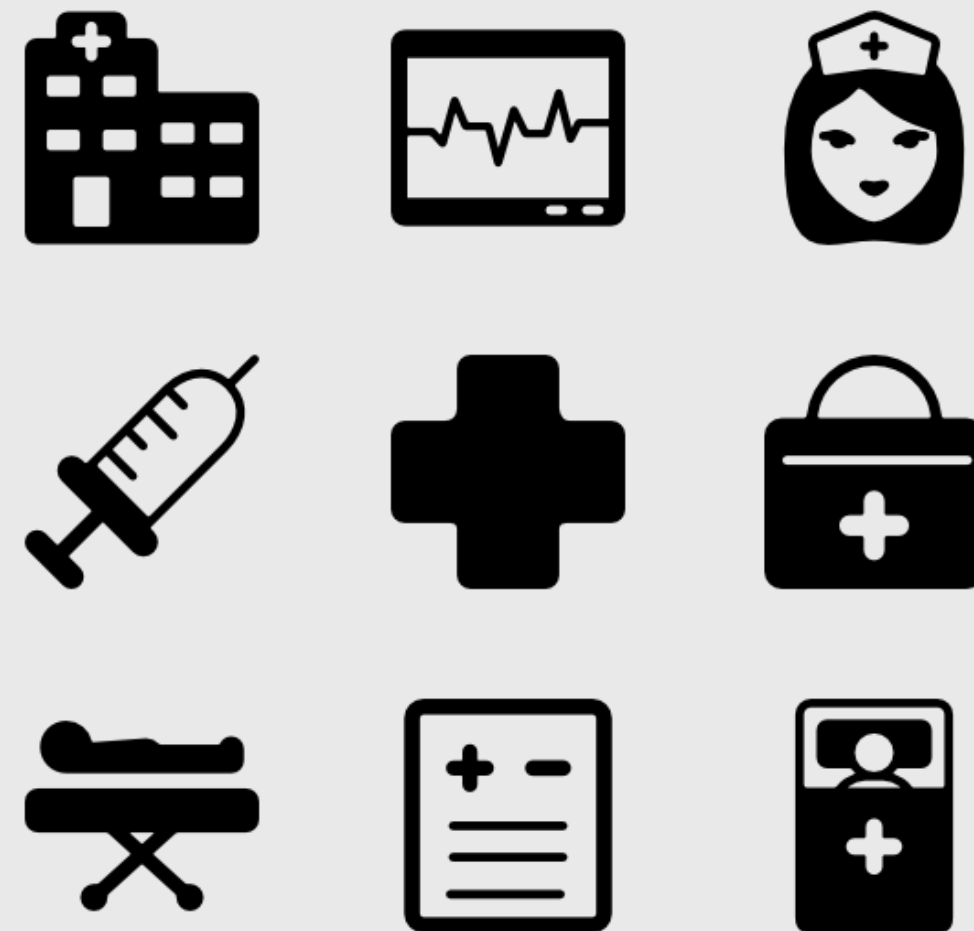
# Disease Precognition Technology





# Target Partners & Customers

## Health Providers



## Pharmaceutical Companies

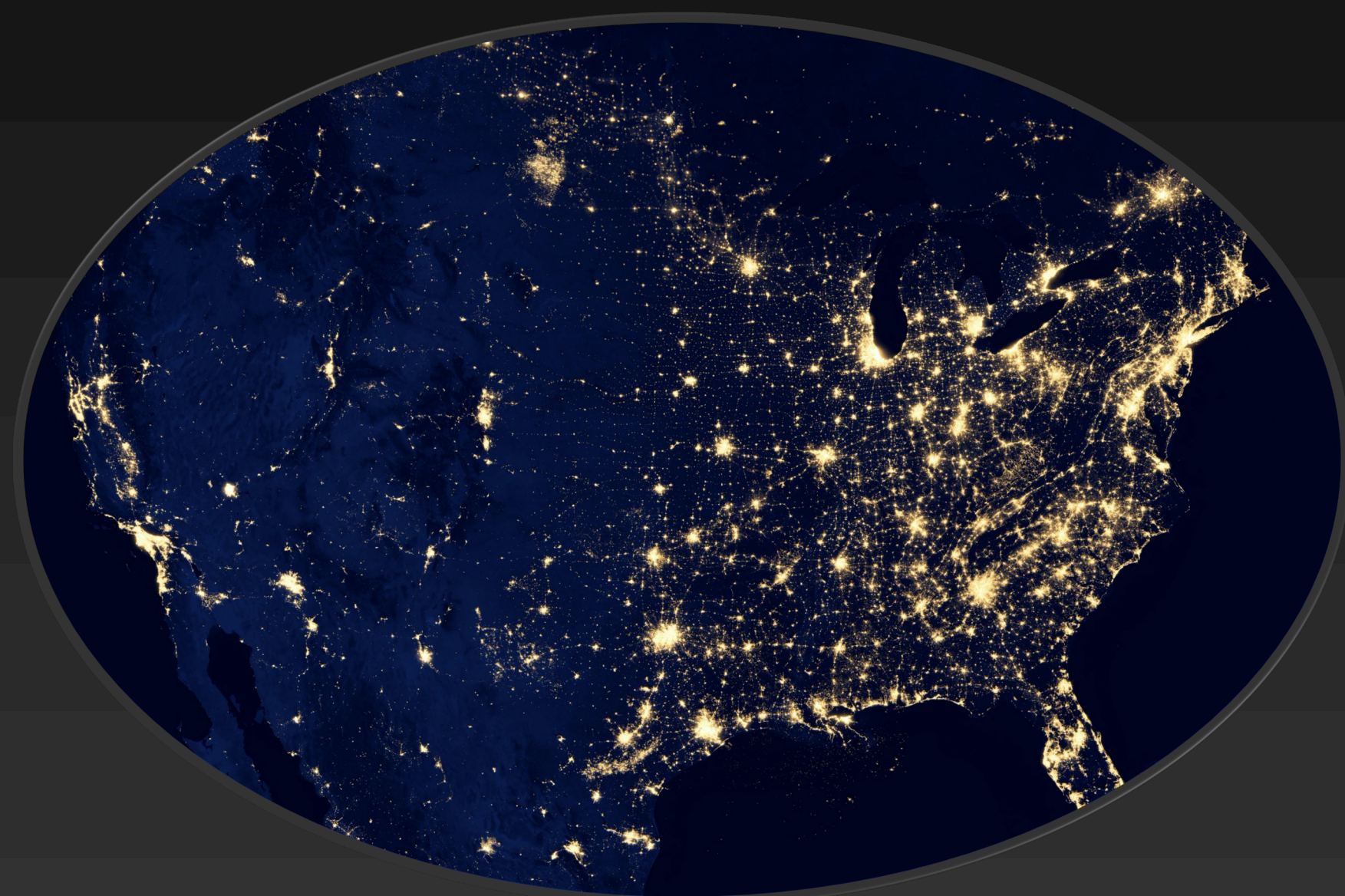


## Decision Makers





# A Growing Market Opportunity



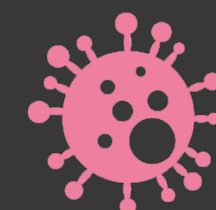
▶ **\$62B**

AI in healthcare market size worth by 2027  
in the US

▶ **\$42B**

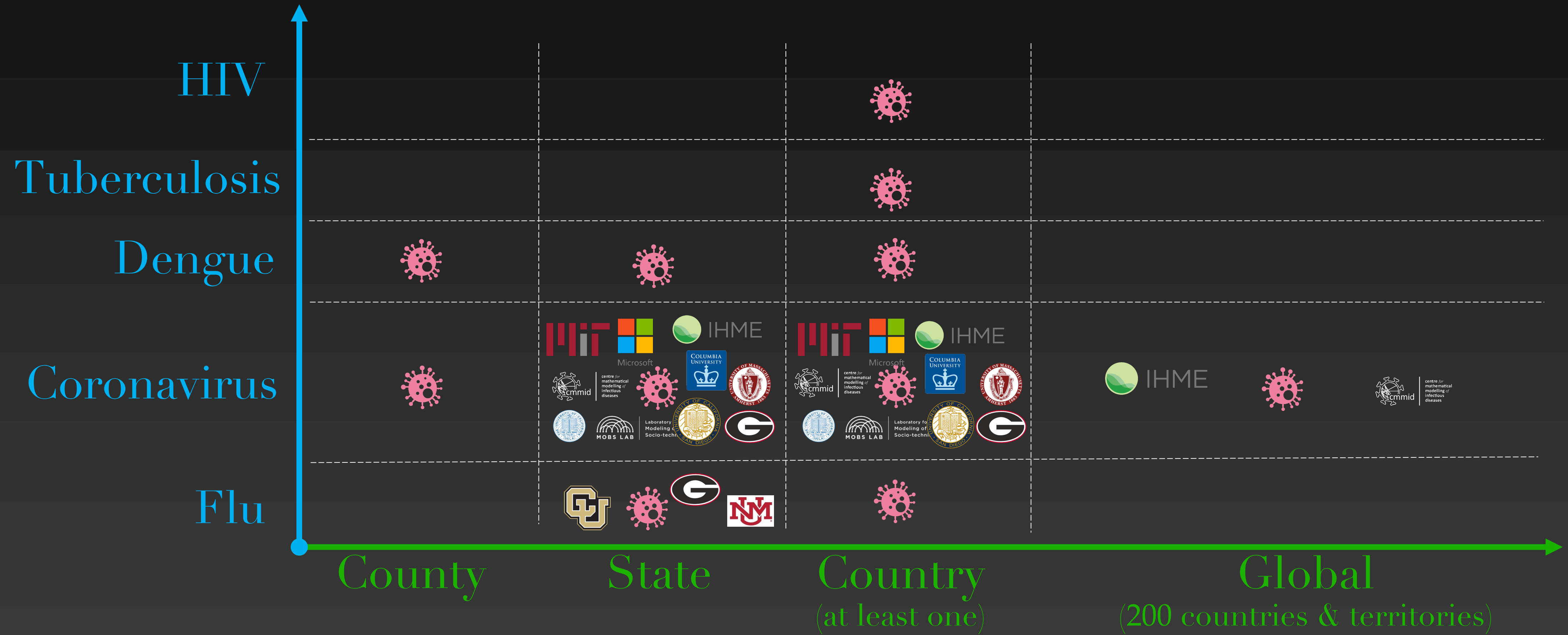
Market share – public health management &  
response in the US

Adoption of advanced  
technologies by pharma  
companies & hospitals is driving  
demand for AI in healthcare



# Competitive Landscape

## Diseases

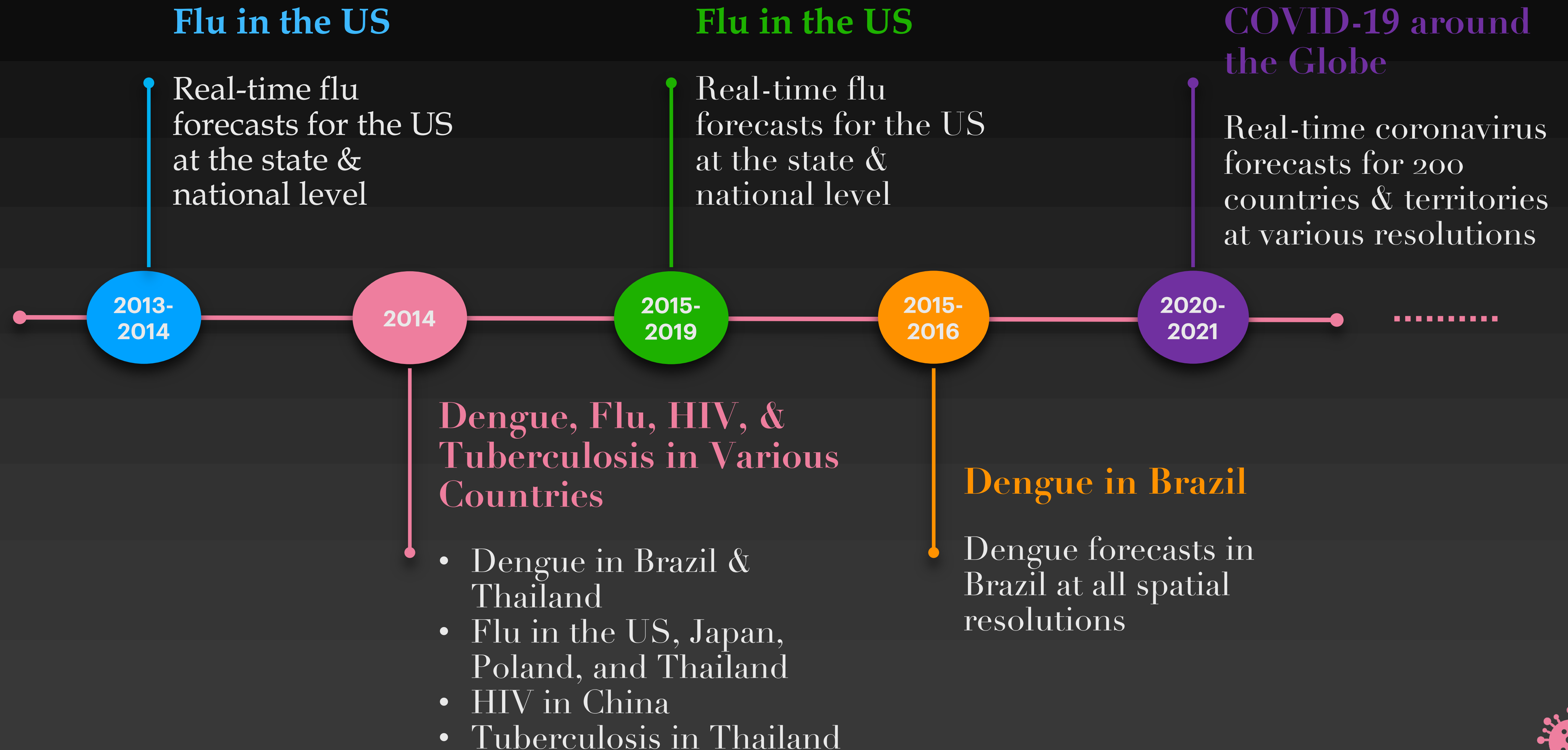


## Spatial Scale

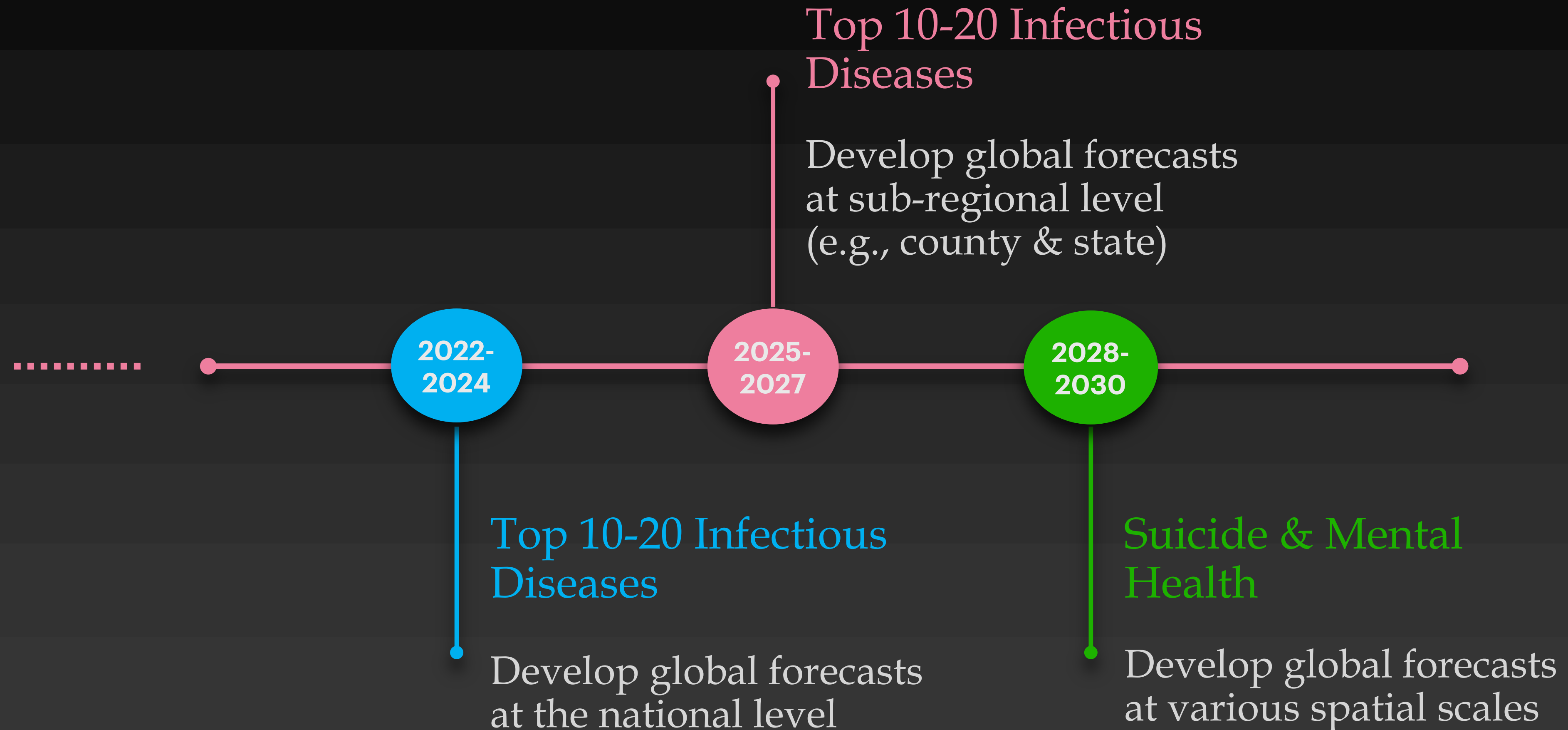




# Technology Roadmap



# Technology Roadmap



# National Security Threats



Nuclear Wars

Infectious Diseases

Climate Change

Cyber Attacks



# Sara Del Valle, PhD



PhD in Applied Mathematics & Computational Sciences



Exploiting big-data and mathematical approaches to understand, forecast, and mitigate disease spread



Work featured in National Geographic, NPR Science Friday, NYT, Popular Mechanics, BBC, etc.





# Team



Sara Del Valle, PhD

TEAM LEADER,  
FOUNDER  
FUNDING



Dave Osthus, PhD

STATISTICS



Carrie Manore, PhD

MATHEMATICS

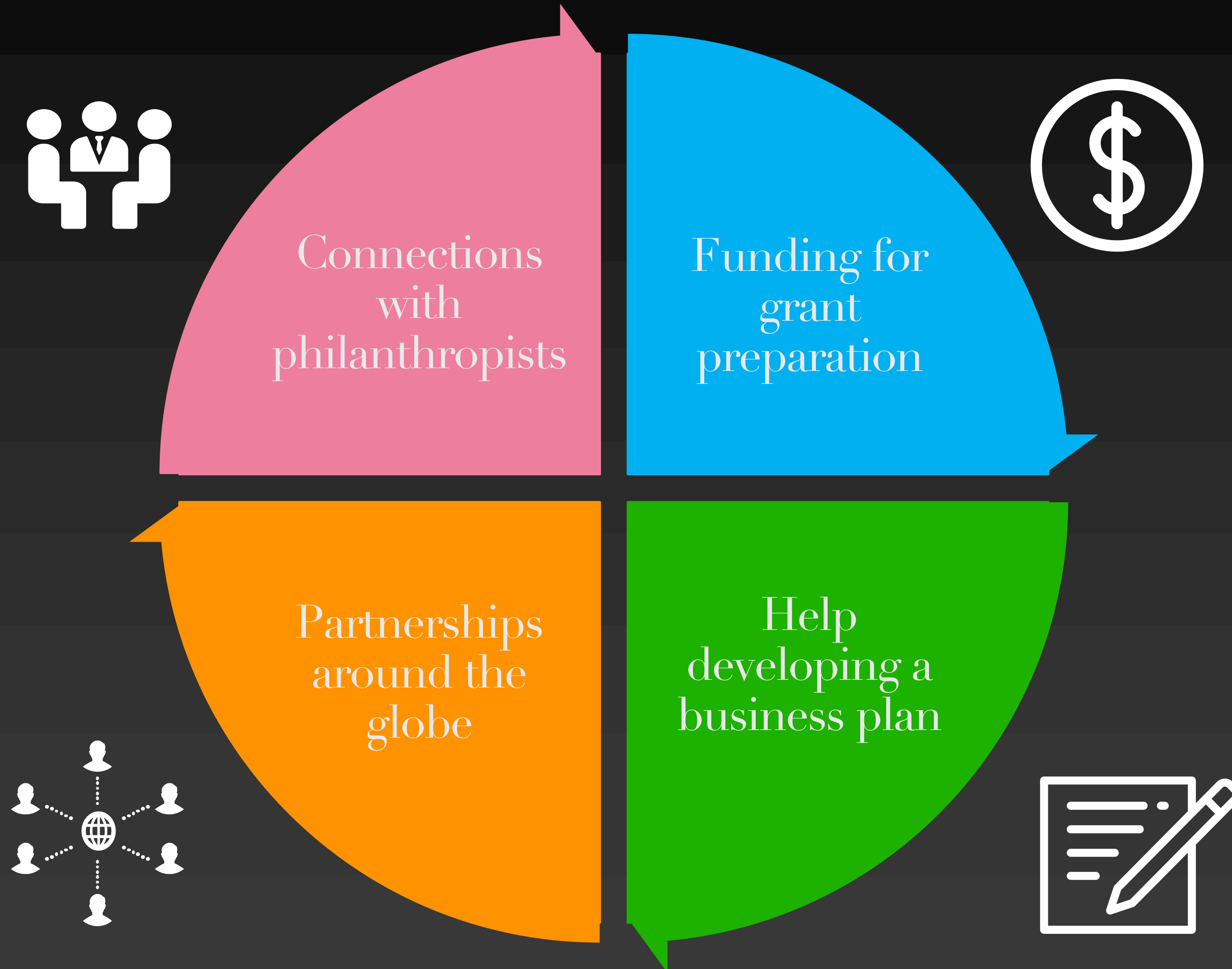


Geoffrey Fairchild, PhD

COMPUTER  
SCIENCE



# What We Need





# Thank You



Disease  
Precognition

Sara Del Valle



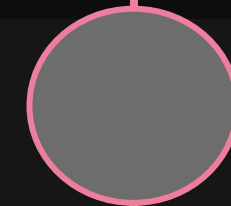
[sdelvall@lanl.gov](mailto:sdelvall@lanl.gov)



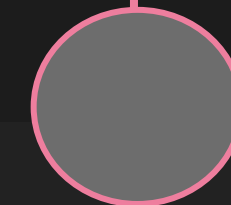
(505) 665-9286



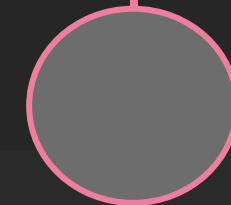
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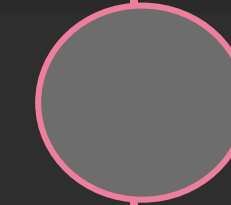
Kaelyn Badura



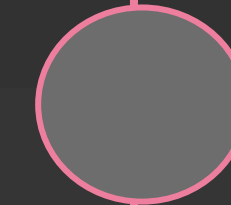
Colleen Pastuovic



John Chavez & John Elling



Mariann Johnston



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